

# Andrew L. Valesano, MD, PhD

avalesan@umich.edu | andrewvalesano.github.io | July 2024

## Education and Medical Training

### Resident Physician

June 2023 – June 2027

Michigan Medicine, Ann Arbor, MI  
Anatomic and Clinical Pathology

### Medical Scientist Training Program

August 2016 – May 2023

University of Michigan Medical School, Ann Arbor, MI  
M.D., Graduation with Distinction  
Ph.D. in Cellular and Molecular Biology

### Undergraduate Education

Hope College, Holland, MI  
Bachelor of Science in Biology, *summa cum laude*

August 2011 - May 2015

## Research Experience

### Postdoctoral Researcher

June 2023 – June 2027

University of Michigan, Department of Pathology

- **Machine Learning for Precancerous Lesions:** Developing weakly-supervised models with whole-slide imaging data to detect incidental serous tubal intraepithelial carcinoma in fallopian tubes
- **Methylation Profiling for Hematolymphoid Neoplasms:** Generating methylation state data and applying classification models to distinguish low and high-grade EBV-related neoplasms
- **Genomics of Non-Langerhans Histiocytoses:** Leading projects using comprehensive molecular profiling to identify molecular features of Rosai-Dorfman disease and adult-onset xanthogranuloma

### Ph.D. Student, Postdoctoral Researcher

August 2018 – Sept. 2021

University of Michigan, Department of Microbiology and Immunology  
Laboratory of Adam Luring, M.D., Ph.D.  
Program in Cellular and Molecular Biology  
Thesis: “Using Intrahost Genetic Diversity to Understand RNA Virus Evolution and Transmission”

- **RNA Virus Genomics:** Developed new methods to characterize within-patient genetic heterogeneity of influenza B virus, poliovirus, and SARS-CoV-2 and quantify human-to-human

transmission bottlenecks in patient cohorts (Valesano et al. *J. Virol*, Valesano et al. *PLoS Pathogens*, Valesano et al. *Cell Host and Microbe*, Dimcheff et al. *J. Infect. Dis.*)

- **COVID-19 Genomic Surveillance:** Led implementation of SARS-CoV-2 genomic surveillance to track novel variants (Alpert et al. *Cell*), study transmission patterns among universities (Valesano et al. *OFID*), enhance hospital monoclonal antibody stewardship (Pogue et al. *OFID*), and support large-scale vaccine effectiveness observational studies (see Consortium Papers – CDC IVY Network); contributions included high-throughput sequencing, bioinformatics, quality control, data management, phylogenetics, and public data sharing of 6,000+ viral whole genome sequences

- **Infectious Diseases Case Studies:** Used genomics to investigate one of the first documented cases of prolonged COVID-19 in an immunocompromised patient (Baang et al. *J. Infect. Dis.*) and the first case of donor-derived infection of SARS-CoV-2 via lung transplantation (Kaul et al. *Am. J. Transplant*)

- **Genomic Epidemiology:** Partnered with public health departments to mitigate local viral outbreaks by integrating real-time genomic sequencing with traditional epidemiology (Martin et al. *medRxiv*); contributions included implementation of rapid Nanopore sequencing pipeline, phylogenetic interpretation of transmission clusters, and timely communication of findings to complement contact tracing

- **Global Health:** Led a project to sequence the oral polio vaccine variants from participants in a field trial in Bangladesh (Valesano et al., *Cell Host and Microbe*), part of an international collaboration supported by the Bill & Melinda Gates Foundation

- **Publications:** 5 first/co-first author papers and 14 papers as co-author

#### **Rotating Graduate Student Researcher**

June 2018 – August 2018

University of Michigan, Department of Microbiology and Immunology

Laboratory of Evan Snitkin, Ph.D.

- Used computational bacterial genomics to study the transmission patterns of *Clostridioides difficile*
- Evaluated geographical clustering within and across three major academic medical centers
- Wrote programming scripts in R, Python, and UNIX for analysis on the UM supercomputer cluster

#### **Rotating Graduate Student Researcher**

July 2017 – Sept. 2017

University of Michigan, Department of Microbiology and Immunology

Laboratory of Adam Luring, M.D., Ph.D.

- Used molecular methods to assess effect of poliovirus polymerase mutations on viral growth and fidelity
- Wrote script with k-mer approach to design primers for virus whole-genome amplification

#### **Undergraduate Researcher**

January 2012 – May 2015

Hope College, Department of Biology, Holland, MI

Laboratory of Aaron Best, Ph.D.

- Transcriptome profiling to investigate transcription regulation in *Giardia lamblia* trophozoites

- Computational genomic-metabolic modeling of metabolic networks in *Shewanella* bacteria

## Work Experience

### Research Data Analyst

October 2022 – May 2023

University of Michigan, Microbiology and Immunology, Ann Arbor, MI

Laboratory of Adam Luring, M.D., Ph.D.

- Contributed to the Michigan Sequencing Academic Partnership for Public Health Innovation and Response (MI-SAPPHIRE) project, an initiative of the CDC and MDHHS to expand statewide pathogen sequencing
- Developed bioinformatic pipelines to visualize genomic surveillance data for COVID-19 and influenza viruses and integrate phylogenetics with fine-scale epidemiologic metadata

### Research Technician

May 2015 – June 2016

University of Michigan, Department of Neurology, Ann Arbor, MI

Laboratory of Eva Feldman, M.D., Ph.D.

- Studied the role of neuronal mitochondrial dysfunction in diabetic neuropathy
- Used live-cell confocal microscopy to quantify mitochondrial trafficking in sensory neurons
- Published work in a peer-reviewed article as a co-author

## Peer Reviewed Journal Articles

**Valesano AL**, Taniuchi M, Fitzsimmons WJ, Islam MO, Ahmed T, Zaman K, Haque R, Wong W, Famulare M, Luring AS. The Early Evolution of Oral Poliovirus Vaccine Is Shaped by Strong Positive Selection and Tight Transmission Bottlenecks. **Cell Host and Microbe** 2021; 29(1):32-43.

*Highlighted by:* Ebel GD. Mutation, Selection, and Bottlenecks in Polio Vaccine Reversion. *Cell Host Microbe*. 2021 Jan 13;29(1):3-5. doi: 10.1016/j.chom.2020.12.018. PMID: 33444554.

**Valesano AL**, Fitzsimmons WJ, Blair CN, Woods RJ, Gilbert J, Rudnik D, Mortenson L, Friedrich TC, O'Connor DH, Petrie JG, Martin ET, Luring AS. SARS-CoV-2 Genomic Surveillance Reveals Little Spread Between a Large University Campus and the Surrounding Community. **Open Forum Infectious Diseases** 2021; 8(11), ofab518.

**Valesano AL**, Blair C, Fitzsimmons WJ, Dimcheff DE, Rumfelt KE, Petrie JG, Martin ET, Luring AS. Temporal Dynamics of SARS-CoV-2 Mutation Accumulation Within and Across Infected Hosts. **PLoS Pathogens** 2021; 17(4):e1009499.

**Valesano AL**, Fitzsimmons WJ, McCrone JT, Petrie JG, Monto AS, Martin ET, Luring AS. Influenza B viruses exhibit lower within-host diversity than influenza A viruses in human hosts. **Journal of Virology**. 2020 94:e01710-19. doi: 10.1128/JVI.01710-19.

*Editor's Spotlight Selection: Articles of Significant Interest.*

Alpert T\*, Brito AF\*, Lasek-Nesselquist E\*, Rothman J\*, **Valesano AL\***, MacKay MJ\*, Petrone ME, Breban MI, Watkins AE, Vogels CBF, Kalinich CC, Dellicour S, Russell A, Kelly JP, Shudt M, Plitnick J, Schneider E, Fitzsimmons WJ, Khullar G, Metti J, Dudley JT, Nash M, Beaubier N, Wang J, Liu C, Hui P, Muyombwe A, Downing R, Razeq J, Bart SM, Grills A, Morrison SM, Murphy S, Neal C, Laszlo E, Rennert H, Cushing M, Westblade L, Velu P, Craney A, Cong L, Peaper DR, Landry ML, Cook PW, Fauver JR, Mason CE, Luring AS, St. George K, MacCannell DR, Grubaugh ND. Early introductions and transmission of SARS-CoV-2 variant B.1.1.7 in the United States. **Cell** 2021; 184, 2595–2604.

\*denotes equal contribution.

Kaul DR, **Valesano AL**, Petrie JG, Sagana R, Lyu D, Lin J, Stoneman E, Smith L, Lephart P, Luring AS. Donor to recipient transmission of SARS-CoV-2 by lung transplantation despite negative donor upper respiratory tract testing. **American Journal of Transplantation** 2021; 00:1–5.

*Winner of 2022 AJT Outstanding Article Award.*

Baang JH, Smith C, Mirabelli C, **Valesano AL**, Manthei DM, Bachman M, Wobus CE, Adams M, Washer L, Martin ET, Luring AS. Prolonged Severe Acute Respiratory Syndrome Coronavirus 2 Replication in an Immunocompromised Patient. **Journal of Infectious Diseases** 2021; 223(1):23-27.

Wan T, Luring AS, **Valesano AL**, Fitzsimmons WJ, Bendall EE, Kaye KS, Petrie JG. Investigating epidemiologic and molecular links between patients with community- and hospital-acquired influenza A: 2017-2018 and 2019-2020, Michigan. **Open Forum Infectious Diseases** 2023; ofad061.

Pogue JM, Luring AS, Gandhi TN, Marshall VD, Eschenauer GA, Nagel JL, Baang JH, Zhou S, **Valesano AL**, Petty LA. Monoclonal antibodies for early treatment of COVID-19 in a world of evolving SARS-CoV-2 mutations and variants. **Open Forum Infectious Diseases** 2021; 8(7), ofab268.

Dimcheff DE, **Valesano AL**, Rumfelt KE, Fitzsimmons WJ, Blair CN, Mirabelli C, Petrie JG, Martin ET, Bhambhani C, Tewari M, Luring AS. Severe Acute Respiratory Syndrome Coronavirus 2 Total and Subgenomic RNA Viral Load in Hospitalized Patients. **Journal of Infectious Diseases** 2021; jiab215.

Rumora AE, Lentz SI, Hinder LM, Jackson SW, **Valesano A**, Levinson GE, Feldman EL. Dyslipidemia impairs mitochondrial trafficking and function in sensory neurons. **FASEB Journal**. 2018 Jan; 32(1):195-207. doi: 10.1096/fj.201700206R.

## Peer Reviewed Journal Articles – Consortium Papers

Lanspa MJ, Dugar SP, Prigmore HL, Boyd JS, Rupp JD, Lindsell CJ, Rice TW, Qadir N, Lim GW, Shiloh AL, Dieiev V, Gong MN, Fox SW, Hirshberg EL, Khan A, Kornfield J, Schoeneck JH, Macklin N, Files DC, Gibbs KW, Prekker ME, Parsons-Moss D, Bown M, Olsen TD, Knox DB, Cirulis MM, Mehkri O, Duggal A, Tenforde MW, Patel MM, Self WH, Brown SM; **Influenza and Other Viruses in the Acutely Ill Network**. Early Serial Echocardiographic and Ultrasonographic Findings in Critically Ill Patients With COVID-19. **CHEST Critical Care**. 2023 Jun;1(1):100002.

Tenforde MW, Patel MM, Ginde AA, Douin DJ, Talbot HK, Casey JD, Mohr NM, Zepeski A, Gaglani M, McNeal T, Ghamande S, Shapiro NI, Gibbs KW, Files DC, Hager DN, Shehu A, Prekker ME, Erickson HL, Exline MC, Gong MN, Mohamed A, Henning DJ, Steingrub JS, Peltan ID, Brown SM, Martin ET, Monto AS, Khan A, Hough CL, Busse LW, ten Lohuis CC, Duggal A, Wilson JG, Gordon AJ, Qadir N, Chang SY, Mallow C, Gershengorn HB, Babcock HM, Kwon JH, Halasa N, Chappell JD, Luring AS, Grijalva CG, Rice TW, Jones ID, Stubblefield WB, Baughman A, Womack KN, Lindsell CJ, Hart KW, Zhu Y, Olson SM, Stephenson M, Schrag SJ, Kobayashi M, Verani JR, Self WH, **Influenza and Other Viruses in the Acutely Ill (IVY) Network**. Effectiveness of Severe Acute Respiratory Syndrome Coronavirus 2 Messenger RNA Vaccines for Preventing Coronavirus Disease 2019 Hospitalizations in the United States. **Clinical Infectious Diseases** 2021; ciab687.

Lewis NM, Naioti EA, Self WH, Ginde AA, Douin DJ, Talbot HK, Casey JD, Mohr NM, Zepeski A, Gaglani M, Ghamande SA, McNeal TA, Shapiro NI, Gibbs KW, Files DC, Hager DN, Shehu A, Prekker ME, Erickson HL, Gong MN, Mohamed A, Henning DJ, Steingrub JS, Peltan ID, Brown SM, Martin ET, Hubel K, Hough CL, Busse LW, Ten Lohuis CC, Duggal A, Wilson JG, Gordon AJ, Qadir N, Chang SY, Mallow C, Rivas C, Babcock HM, Kwon JH, Exline MC, Halasa N, Chappell JD, Luring AS, Grijalva CG, Rice TW, Rhoads JP, Stubblefield WB, Baughman A, Womack KN, Lindsell CJ, Hart KW, Zhu Y, Schrag SJ, Kobayashi M, Verani JR, Patel MM, Tenforde MW, **IVY Network Collaborators**. Effectiveness of mRNA Vaccines Against COVID-19 Hospitalization by Age and Chronic Medical Conditions Burden Among Immunocompetent US Adults, March-August 2021. **Journal of Infectious Diseases** 2022; 225(10):1694–1700.

Luring AS, Tenforde MW, Chappell JD, Gaglani M, Ginde AA, McNeal T, Ghamande S, Douin DJ, Talbot HK, Casey JD, Mohr NM, Zepeski A, Shapiro NI, Gibbs KW, Files DC, Hager DN, Shehu A, Prekker ME, Erickson HL, Exline MC, Gong MN, Mohamed A, Johnson NJ, Srinivasan V, Steingrub JS, Peltan ID, Brown SM, Martin ET, Monto AS, Khan A, Hough CL, Busse LW, ten Lohuis CC, Duggal A, Wilson JG, Gordon AJ, Qadir N, Chang SY, Mallow C, Rivas C, Babcock HM, Kwon JH, Halasa N, Grijalva CG, Rice TW, Stubblefield WB, Baughman A, Womack KN, Rhoads JP, Lindsell CJ, Hart KW, Zhu Y, Adams K, Schrag SJ, Olson SM, Kobayashi M, Verani JR, Patel MM, Self WH, **Influenza and Other Viruses in the Acutely Ill (IVY) Network**. Clinical severity of, and effectiveness of mRNA

vaccines against, covid-19 from omicron, delta, and alpha SARS-CoV-2 variants in the United States: prospective observational study. **BMJ** 2022; 376:e069761, doi:10.1136/bmj-2021-069761.

Tenforde MW, Self WH, Adams K, Gaglani M, Ginde AA, McNeal T, Ghamande S, Douin DJ, Talbot HK, Casey JD, Mohr NM, Zepeski A, Shapiro NI, Gibbs KW, Files DC, Hager DN, Shehu A, Prekker ME, Erickson HL, Exline MC, Gong MN, Mohamed A, Henning DJ, Steingrub JS, Peltan ID, Brown SM, Martin ET, Monto AS, Khan A, Hough CL, Busse LW, ten Lohuis CC, Duggal A, Wilson JG, Gordon AJ, Qadir N, Chang SY, Mallow C, Rivas C, Babcock HM, Kwon JH, Halasa N, Chappell JD, Luring AS, Grijalva CG, Rice TW, Jones ID, Stubblefield WB, Baughman A, Womack KN, Rhoads JP, Lindsell CJ, Hart KW, Zhu Y, Olson SM, Kobayashi M, Verani JR, Patel MM, **Influenza and Other Viruses in the Acutely Ill (IVY) Network**. Association Between mRNA Vaccination and COVID-19 Hospitalization and Disease Severity. **JAMA** 2021; 326(20):2043–2054. doi:10.1001/jama.2021.19499.

WH Self, Tenforde MW, Rhoads JP, Gaglani M, Ginde AA, Douin DJ, Olson SM, Talbot HK, Casey JD, Mohr NM, Zepeski A, McNeal T, Ghamande S, Gibbs KW, Files DC, DN Hager, Shehu A, Prekker ME, Erickson HL, Gong MN, Mohamed A, Henning DJ, Steingrub JS, Peltan ID, Brown SM, Martin ET, Monto AS, Khan A, Hough CL, Busse LW, Ten Lohuis CC, Duggal A, Wilson JG, Gordon AJ, Qadir N, Chang SY, Mallow C, Rivas C, Babcock HM, Kwon JH, Exline MC, Halasa N, Chappell JD, Luring AS, Grijalva CG, Rice TW, Jones ID, Stubblefield WB, Baughman A, Womack KN, Lindsell CJ, Hart KW, Zhu Y, Mills L, Lester SN, Stumpf MM, Naioti EA, Kobayashi M, Verani JR, Thornburg NJ, Patel MM, **IVY Network**. Comparative Effectiveness of Moderna, Pfizer-BioNTech, and Janssen (Johnson & Johnson) Vaccines in Preventing COVID-19 Hospitalizations Among Adults Without Immunocompromising Conditions - United States, March-August 2021. **MMWR Morb Mortal Wkly Rep**. 2021 Sep 24; 70(38):1337-1343. doi: 10.15585/mmwr.mm7038e1.

Tenforde MW, Self WH, Naioti EA, Ginde AA, Douin DJ, Olson SM, Talbot HK, Casey JD, Mohr NM, Zepeski A, Gaglani M, McNeal T, Ghamande S, Shapiro NI, Gibbs KW, Files DC, Hager DN, Shehu A, Prekker ME, Erickson HL, Gong MN, Mohamed A, Henning DJ, Steingrub JS, Peltan ID, Brown SM, Martin ET, Monto AS, Khan A, Hough CL, Busse LW, Ten Lohuis CC, Duggal A, Wilson JG, Gordon AJ, Qadir N, Chang SY, Mallow C, Rivas C, Babcock HM, Kwon JH, Exline MC, Halasa N, Chappell JD, Luring AS, Grijalva CG, Rice TW, Jones ID, Stubblefield WB, Baughman A, Womack KN, Lindsell CJ, Hart KW, Zhu Y, Stephenson M, Schrag SJ, Kobayashi M, Verani JR, Patel MM, **IVY Network Investigators**. Sustained Effectiveness of Pfizer-BioNTech and Moderna Vaccines Against COVID-19 Associated Hospitalizations Among Adults - United States, March-July 2021. **MMWR Morb Mortal Wkly Rep**. 2021 Aug 27; 70(34):1156-1162. doi: 10.15585/mmwr.mm7034e2.

## Non-Peer Reviewed Articles and Preprints

Martin ET, Luring AS, Montgomery JP, **Valesano AL**, Eisenberg MC, Sheen D, Nord J, Ernst RD, Mortenson LY, Valdez R, Niknafs Y, Conway D, Rifat SF, Bagdasarian N, Lyon-Callo S, Collins J, Blankenship H, Soehnlen M, Marquez J. Containment of a multi-index B.1.1.7 outbreak on a university campus through a genomically-informed public health response. **medRxiv** 2022; doi: <https://doi.org/10.1101/2022.01.04.22268758>.

**Valesano AL**, Lee EM. Case of Hepatopulmonary Syndrome. Society of Thoracic Radiology, Thoracic Case of the Month. August 2022.

## Research Presentations

“Sudden Death Due to Gallbladder Perforation.”

**Valesano AL**, Snyder AM, Wilson AM.

Poster presentation at Advances in Forensic Medicine and Pathology. Ann Arbor, Michigan, May 16, 2024.

*Outstanding Poster Award.*

“Investigating sources of hospital-acquired influenza infection in two seasons”

Wan T, Luring AS, **Valesano AL**, Fitzsimmons WJ, Bendall EE, Kaye KS, Petrie JG.

Poster presentation at OPTIONS XI for the Control of Influenza. Belfast, Northern Ireland, September 26, 2022.

“What Can Genome Sequencing Tell Us About RNA Virus Evolution and Spread?”

**Valesano AL**.

Invited seminar at the Hope College Department of Biology, Holland, MI, 2021.

“SARS-CoV-2 Genomic Surveillance Reveals Little Spread Between a Large University Campus and the Surrounding Community”

**Valesano AL**, Fitzsimmons WJ, Blair CN, Woods RJ, Gilbert J, Rudnik D, Mortenson L, Petrie JG, Martin ET, Luring AS.

Poster presentation at IDWeek 2021 (virtual conference).

Poster presentation at Virus Genomics and Evolution 2021 (virtual conference).

“SARS-CoV-2 Replication and Evolution in an Immunocompromised Patient”

**Valesano AL**, Baang JH, Smith C, Mirabelli C, Manthei DM, Bachman M, Wobus CE, Adams M, Washer L, Martin ET, Luring AS.

Oral presentation at the University of Michigan MSTP Annual Retreat 2021 (virtual conference).

“Limited intrahost diversity and convergent evolution within hosts complicate transmission inference for SARS-CoV-2”

**Valesano AL**, Rumfelt KE, Dimcheff DE, Blair CN, Fitzsimmons WJ, Petrie JG, Martin ET, Luring AS.

Oral presentation at the American Society for Virology General Meeting, 2021 (virtual conference).

Poster presentation at the CMB Spring Symposium 2021 (virtual conference).

“Genomic Epidemiology of SARS-CoV-2 at the University of Michigan in Fall 2020”

**Valesano AL**, William J. Fitzsimmons, Christopher N. Blair, Robert J. Woods, Joshua G. Petrie, Emily T. Martin, Adam S. Luring.

Oral presentation at the University of Michigan Internal Medicine Annual Research Symposium, 2021 (virtual conference).

“Evolutionary dynamics of type 2 oral polio vaccine in primary recipients and household contacts”

**Valesano AL**, Taniuchi M, Fitzsimmons WJ, Islam MO, Ahmed T, Zaman K, Haque R, Wong W, Famulare M, Luring AS.

Invited oral presentation at the Institute for Disease Modeling, Bellevue, WA, 2020.

Invited oral presentation at the University of Virginia, Charlottesville, VA, 2019.

“Within and Between-Host Evolution of Influenza B Virus in a Household Cohort”

**Valesano AL**, Fitzsimmons WJ, Petrie JG, Monto AS, Martin ET, and Luring AS.

Oral presentation at the American Society for Virology Annual Meeting, Minneapolis, MN, 2019.

Poster at the CMB Spring Symposium, Ann Arbor, MI, 2019.

“Transcriptome Profiling of the Life Cycle of *Giardia lamblia* Using RNA-seq”

**Valesano AL** and Best AA.

Poster at the American Society for Microbiology General Meeting, Boston, MA, 2014.

Poster at the Beckman Symposium, Irvine, CA, 2014.

“Comparative Analysis of 26 Genome-Scale Metabolic Models of the Genus *Shewanella*”

**Valesano AL**, Eguiluz ME, and Best AA.

Poster at the American Society for Microbiology General Meeting, Denver, CO, 2013.

Poster at the Midstates Consortium for Math and Science, St. Louis, MO 2013.

## Activities and Service

### MedConnect Program Volunteer

June 2020 – August 2020

University of Michigan Medical School, Ann Arbor, MI

- Address social isolation among admitted patients during the COVID-19 pandemic



- Coordinated with medical social workers who identified patients in need of support by phone call
- Called patients >1 time per week for 30 minutes for social and emotional support
- Followed up with social work for patients with more intensive needs

**Student Advising Committee, Program in Cellular and Molecular Biology** August 2019 – May 2021

University of Michigan Medical School, Ann Arbor, MI

- Served as a academic advisor for graduate students in the Cellular and Molecular Biology program
- Held regular advising sessions for coursework and preparing for comprehensive examinations

**High School Student Mentor, Doctors of Tomorrow Program** August 2016 – May 2017

University of Michigan Medical School, Ann Arbor, MI

- Participated in Doctors of Tomorrow, a program designed to prepare underrepresented communities for future careers in medicine
- Mentored students from Cass Technical High School in Detroit, Michigan on a weekly basis
- Led a small group of students conducting a research project on health disparities

## Teaching Experience

**Assistant Instructor** September 2023 – December 2023

University of Michigan, Department of Pathology  
Translational Pathology 862

**Graduate Student Instructor** January 2020 – April 2020

University of Michigan, Department of Microbiology and Immunology

- GSI for one semester of “MICROBIOL 405: Introduction to Microbiology” for a class of 90 students
- Held one-hour discussion sections twice weekly
- Developed original review materials for review sessions

## Honors and Awards

Outstanding Poster Award, Advances in Forensic Medicine & Pathology	2024
Dean’s Award for Research Excellence, University of Michigan Medical School	2023
Academic Recognition Award, University of Michigan Medical School	2023
Graduation with Distinction, University of Michigan Medical School	2023
Graduation with Distinction in Research, University of Michigan Medical School	2023
American Society for Virology Student Registration Award	2021

Cellular and Molecular Biology Graduate Fellowship, University of Michigan	2019
Patterson Memorial Prize in Biology, Hope College	2015
Sigma Xi Undergraduate Research Award, Hope College	2015
Phi Beta Kappa, Hope College	2015
Barry M. Goldwater Scholarship	2014
Arnold and Mabel Beckman Research Scholarship, Hope College	2013
American Society for Microbiology Undergraduate Research Fellowship	2013
American Society for Microbiology Student Travel Grant	2013

## Additional Skills and Training

### **Supervised and Unsupervised Machine Learning** 2021

Summer Institute in Statistics for Big Data, University of Washington

Topics: Regression, classification, decision trees, neural networks, clustering, dimensionality reduction

### **Evaluation of Biomarkers and Risk Models** 2021

Summer Institute in Statistics for Clinical and Epidemiologic Research, University of Washington

Topics: Prognostic and predictive biomarkers, calibration and discrimination, ROC curves

### **Spatial Statistics for Epidemiology**

2020

Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington

Topics: RMarkdown, geographic mapping and regression

### **Reconstructing Transmission with Genomic Data** 2020

Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington

Topics: Bayesian and maximum-likelihood inference of transmission networks

### **Model-Based Statistical Inference in Ecology**

2018

Ecology and Evolutionary Biology 480, University of Michigan

Topics: R, regression models, maximum likelihood, Bayesian statistics